



CAN/CAN FD/LIN DATA Logger

LE-270AF

LE-270GF

Instruction Manual

The attached CD-ROM contains the latest instruction manual in a PDF format.

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INTRODUCTION

Thank you for your purchase of LINEEYE's protocol analyzer. To use it correctly, you are advised to read and understand this instruction manual thoroughly. Keep this together with the warranty. If you encounter any problems, you will find helpful information in this manual.

NOTICE

- It is prohibited to reprint or duplicate any part or the whole of this instruction manual without prior permission from LINEEYE.
- The contents of this instruction manual and specifications of the products are subject to change without notice.
- This instruction manual has been designed and edited with great care to give you all necessary information. If you have any questions, feel free to direct your inquiries to LINEEYE CO., LTD.
- LINEEYE assumes no responsibility whatsoever for any damages resulting from the use of this product. Furthermore, LINEEYE makes no guarantee of data etc. When data disappears, or even when the recorded data has broken while using this product.

USER LIMITATION

This product has been developed for the purpose of using as an analyzer only, and has not been developed for the use that needs exclusively high reliability and safety; aerospace apparatus, trunk communication apparatus, nuclear control apparatus, medical apparatus related with life maintenance and etc. Also, this product does not warrant the use for those purposes. If you use for those purposes, please consider the safety measures against fail-safe etc. on your responsibility.

This product has Wi-Fi function (IEEE 802.11b/g/n) and emits radio wave when working. Please do not use near a medical device, microwave, high-level electronics, TV, radio, wireless station for mobile communications, or specified low power radio station. Where an administrator limits the use of radio devices, follow the instruction of the administrator.

However, without the Wi-Fi setting file in the inserted SD card the Wi-Fi function is invalid and it does not emit radio.

SIMPLIFIED EU DECLARATION OF CONFORMITY

Hereby, LINEEYE declares that the communication protocol analyzer type LE-270GF / LE-270AF with radio remote-control function is in compliance with Directive 2014/53/EU.

The full text of the EU declaration of conformity is available at the following internet address:

<https://www.lineeye.com/html/contactus.html>

Wi-Fi AVAILABLE COUNTRIES

The Wi-Fi function of the analyzer is available only in Japan, USA, Canada, and the EU nations where the product needs to be conformable to RE directive (2014/53/EU) for use.

Read this first !!

This Safety Information includes the important information in order to not only have you learn the right way to use the analyzer, but also prevent you from causing damage to people and property. Before using, please read the main contents after you understand the following contents (symbols and marks).

[Explanation of the symbols (The degree of the hazard factor)]



WARNING

The symbol denotes that improper handling poses a risk of causing death or serious injury.



CAUTION

The symbol denotes that improper handling poses a risk of causing injury^{*1} or damage to the product and property^{*2}.

*1: "Injury" indicates injury, burn, an electric shock, or the like which does not require hospitalization or the extend over a long period of hospital visit.

*2: "Damage to the product and property" indicates damage expansion related to a house, a building,



WARNING

- Do not disassemble or modify.

This may result in fire, an electric shock and/or unit malfunction.

- Stop using the analyzer immediately when smells emanate from itself.

Continuous use may result in an electric shock, a burn and/or fire.

- Keep the products away from water.

Failure to do so may result in the heat generation, an electric shock and/or unit malfunction.

- Do not short-circuit the connector pins.

This may result in the heat generation, an electric shock, unit malfunction and/or injury.

- Do not use deteriorated cables (damage etc.).

This may result in the heat generation and fire.

- Do not use in the place which generates inflammable gas etc.

This may result fire.



CAUTION

- Do not use and keep this product in the following places:

- The places exposed to the direct rays of the sun.
 - The places with the humidity and temperature exceeding the tolerance level, and with a rapid temperature change.
 - The places with much dust and moisture.
 - The places near the objects which generate heat (the heater etc.).
- Using in these places may result unit malfunction and /or injury.

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LINEEYE CO., LTD.

Chapter 1 Before Using the Product

LE-270AF/LE-270GF is the CAN/LIN communication analyzer, which can be used as a PC-connectable protocol analyzer and PC-less Data logger. It has two High-speed CAN/CAN FD transceivers, and two LIN transceivers. It monitors two channels of CAN/CAN FD or LIN, or one CAN/CAN FD and one LIN channels. In addition, four channels of Analog/Digital signals can be recorded. LE-270GF has GPS receiver and acceleration sensor and can register positioning and acceleration information besides CAN/LIN communication data. Power failure protection, water-proofing and low power consumption widens the usage of analyzer such as in the automation factories and other production factories,

1.1 Composition

When you unpack the product, please make sure of the following

Protocol Analyzer	: 1
Utility CD (CD-ROM)	: 1
SDHC card (8GB)	: 1
Mini USB cable	: 1
CAN/LIN Dsub cable (Model: LE-25M3A-1)	: 1
Power plug cable (Model: SIH-2PG)	: 1
Instruction Manual	: 1 (This book)
Warranty	: 1

* Please contact LINEEYE distributor or us if you find any insufficient part or any damage to the product caused by transportation.

* Please keep the box carefully to use it when sending the product back to us for repair etc.

● Utility CD

Utility CD contains the analysis software, driver and some instruction manuals of analyzer and its options.

You can download the update file of software from <https://www.lineeye.com>

1.2 Outline

■ Functions

1). On-line Monitoring

Monitor the transmission/reception data on-line to check the existence of hindrance and communication data in the line or to analyze the communication.

2). Simulation function

The product takes a role of a node of CAN/LIN and transmits the data frame or remote frame set by the user.

■ Feature

* 2-way operation of PC-connected protocol analyzer and data logger that can be installed on site without a PC.

* Multiple analyzers can be controlled remotely by one PC for monitoring.

* Measure two channels of CAN/CAN FD/LIN in combination and four channels of Analog/Digital signals at the same time.

* Powerful trigger function and ID filter for sufficient analysis.

* Record measured data continuously in the HDD of PC or SD card.

(SD card capacity is up to 32GB).

* Specify the recording time by Real Time Clock. Turn On/Off the power automatically.

* Power failure protection and wide range of ambient temperature make it possible to use it in the severe conditions. (-20°C - +55°C)

* Compact size. Able to use the 35mm DIN rail.

* You can receive the file of the measuring data in logger mode through Wi-Fi.

8.3 Receive the logger files by Wi-Fi connection.

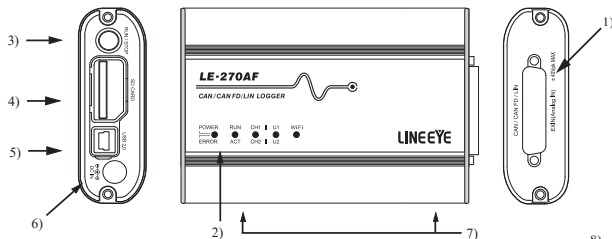
(The Wi-Fi function is available only in Japan, USA, Canada, and EU nations where the product is needed to be compliant with RE directive (2014/53/EU).)

* You can log the GPS positioning and acceleration data. [Supported only by LE-270GF]

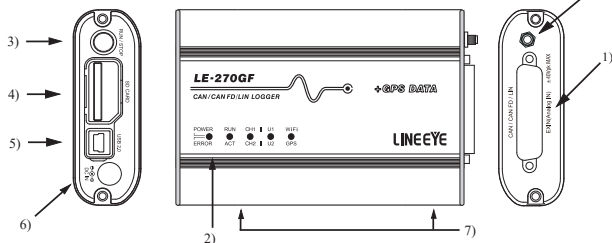
* The measurement port is isolated from the USB port by the galvanic isolation [Only LE-270GF]

1.3 Explanation of Each Part

LE-270AF



LE-270GF



1) Measurement Interface

The measurement interface consists of a DSUB 25pin connector to connect to CAN/LIN target devices and external input signals.

Measurement port is isolated from USB port by galvanic isolation(1kV) (Only LE-270GF).

2) LED

POWER/ERROR : Indicate the operating status of analyzer.

RUN/ACT : Indicate that analyzer is measuring or accessing to the SD card.

POWER/ERROR	RUN/ACT	Status	
Light off	Light off	Power Off	
Green light	Light off	Protocol Analyzer Mode	Ready to operate
	Green light		Under measurement
	Red light		Accessing to the SD card ^{*1}
	Orange light		Measuring and Accessing to the SD card ^{*1}
Orange light	Light off	Logger Mode	Ready to operate
	Green light		Measuring
	Green blinking		Ready to start measuring
	Red light		Accessing to the SD card ^{*1}
Orange blinking	Orange light		Measuring and Accessing to the SD card ^{*1}
	-		The built-in clock has been initialized and needs to be reset. ^{*2}
Light off	Green light	Firmware Update Mode	
Red blinking (high speed)	-	Error	Self check error, exception error ^{*3}

*1: Do not remove the SD card while lighting.

*2: By starting measurement in Protocol Analyzer Mode, you can set the PC time to the internal clock.

*3: Contact LINEEYE distributors or LINEEYE for support.

CH1/CH2 : Indicate the logic status of CH1/CH2 Line. Display the logic state of CH1 line(green - blink) and CH2 line(red - blink).

U1/U2 : Able to light the U1 (green) /U2 (red) by trigger actions.

WiFi/GPS : When you select “Station” in the Wi-Fi setting of “Wireless LAN configuration file”, the LED lights in green (WiFi) when it completes connecting with an external Wi-Fi access point.

When you select “Access point” in the Wi-Fi setting, it lights in green (Wi-Fi) when the access point in the analyzer runs.

For LE-270GF only, the LED lights in red (GPS) when the analyzer receives a GPS radio.

* The LED is two colors LED and it looks orange when both of them light.

3) RUN/STOP Switch

Press to start measuring. Press for a while to stop measuring.

4) SD Card Slot

Insert the SD card as the following figure. To remove the SD card, press the SD card and it will come out from the analyzer.



<Dust-proofing cover>

There is a dust-proofing cover on the SD card slot and USB connector. To remove the SD card, open the cover as following.



Also, it is possible to open the cover for USB connector only as following.



5) USB Connector

Use the included USB cable to connect the host PC.

6) DC Jack

Connect the power supply when using the analyzer as a Data Logger. Optional plug cable “SIH-2PG” is available.

DC plug type: center-plus, outside diameter 5.5mm, inside diameter 2.1mm.

7) M3 Screw Hole

This is for connecting the analyzer on the DIN rail. Pitch: 70mm. Depth: 3.5mm (max).

8) Connector for GPS antenna (Only for LE-270GF)

SMA connector (female) for active GPS antenna

Connect a GPS antenna.

Chapter 2 Installation

Install the analysis software "LE-LIK27F" to the PC you are going to operate the analyzer.

2.1 System Requirement

- HDD : 35MB + capacity for recording communication log
- OS : Windows 10/11
- Port : USB 2.0 port

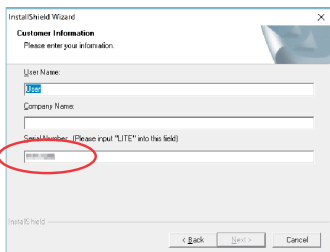
SD card drive : It is required for the Data Logger mode to save log files and to read configuration settings.

- * When you use Wifi function, Wi-Fi access point which supports IEEE 802.11 b/g/n (2.4GHz) is needed.
The Wi-Fi function is available only in Japan, USA, Canada, and EU nations where the product is needed to be compliant with RE directive (2014/53/EU).

2.2 Installation of the Analysis Software

■ Install

1. Insert the included CD-ROM into the CD-ROM drive of the PC.
Open the folder of "pcsoft" and click on "Setup.exe".
2. Click "Yes" if the user account dialog box appears.
3. Follow the Install Shield wizard.
4. Read the software license agreement and click "Yes".
5. Input the serial number of analyzer. (Check the back side of the analyzer)
6. After setup has completed, click "Finish".



7. Protocol analysis software (LE-LINK27F) is installed.

■ Uninstall

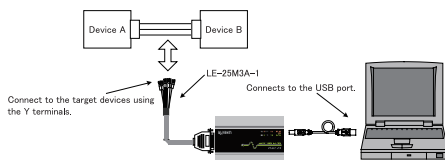
1. Open "Add/Remove Application" in the "Control Panel."
(It might be "Add/Remove Programs" for other OS.)
2. Select "LE-LINK27F" and execute "Remove".

2.3 Set up for the internal RTC (Clock IC)

The lithium secondary battery supplies back up power for the internal RTC (Clock IC). When you use the analyzer for the first time or when you have not used it for a long time, before using it in logger mode, connect the analyzer with a PC by USB cable and execute the measurement operation for once in protocol analyzer mode. When it starts the measurement the time and date in the PC will be set to the RTC in the analyzer. While this operation (for the minutes) lithium secondary battery will be charged and the RTC keeps the date and time for about two days in the power-off condition. When the analyzer is powered for hours, the battery will be fully charged and the date and time in the RTC will be kept for more than 6 months.

3.1 Connection

■ Protocol Analyzer Mode



- 1). Connect the USB cable to the analyzer
- 2). Connect LE-270AF/LE-270GF by USB or Wi-Fi with the PC to which the analysis software is installed.
- 3). Connect the analyzer and target devices using the LE-25M3A-1.

- For CAN communication, connect following signals.

Signal	Meaning	Measurement port Dsub25 connector
CAN H	CAN bus signal	Connect to CAN1H (15) or CAN2H (19)
CAN L		Connect to CAN1L (16) or CAN2L (21)
GND	Signal ground	Connected to either (4), (7) or (22) of GND

* Low Speed CAN is not supported.

- For LIN communication, connect following signals.

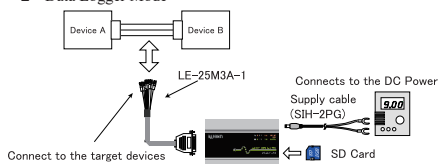
Signal	Meaning	Measurement port Dsub25 connector
BATT	Battery power supply (9-18V)	Connect to BATT (1)
LIN	LIN bus signal	Connect to LIN1 (23) or LIN2 (24)
GND	Signal ground	Connected to either (4), (7) or (22) of GND

* BATT cannot be supplied from this machine, so please supply it externally.

* Connect after supplying power to this unit. If you connect first, it will start up in data logger mode.

 10.1 Interface (CAN/LIN/External Input)

■ Data Logger Mode



- 1). Connect the DC plug cable (SIH-2PG) or AC adapter (6A-181WP09) to the analyzer.
- 2). Insert the SD card, which saved the configuration settings of the analyzer.
- 3). Connect the analyzer and target devices using the LE-25M3A-1.

<SIH-2PG>

Connect the black/white cable to the positive electronic pole of DC power.

<External power supply>

- External power supply range for DC IN is from DC9V to 34V.
(The peak surge voltage should not exceed 34V at power-on.)
- External power supply range for BATT of the Dsub25 is from DC9V to 34V.
(The peak surge voltage should not exceed 34V at power-on.)
- Power consumption of LE-270AF is 120mA when DC is 12V. (230mA when using Wi-Fi)
- Power consumption of LE-270GF is 170mA when DC is 12V. (280mA when using Wi-Fi)
- Suitable DC plug is center plus 5.5mm (outside) / 2.1mm (inside).

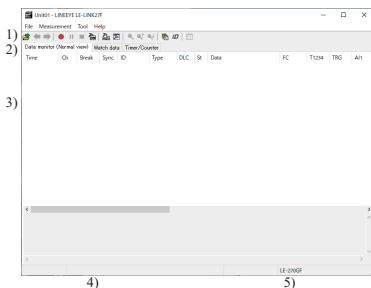
3.2 Configuration of Analysis Software

■ Execute the analysis software

Start “LINEEYE” and “LE-LINK27F” from the Windows “Start” menu.

From [Start] menu of Windows, go to [LINEEYE] -> [LE-LINK27F].

The following data window will appear for the first time.



1). Menu

Perform various operations.

2). Tool Bar

Perform various operations.

Multiple connections of analyzers can be made using the [] button (or the menu item [Tools]->[Connection Setting List]).

3.3 Multiple analyzer connections

3). Data Display

Display the measured data.

4). Data Position Display

Display the data file name and data position of Data display. The number of data loss will be displayed while monitoring.

5). Model Name Display

Display the model name of analyzer.

■ Connection Settings

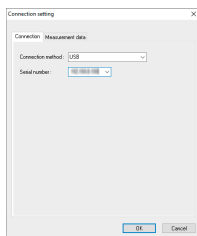
Click “ ” on the tool bar of the data window (or “Measurement” -> “Connection setting”) and set the connection settings and data saving settings.

The connection settings consist of “Connection” and “Measurement data”.

● “Connection” tab

“Connection method” are for the setting of connection.

<USB>

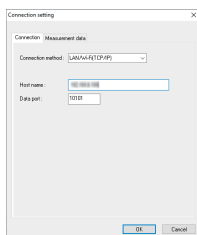


“Serial number” (USB)

Set the serial number of the analyzer to be controlled.

You can select it from the drop down list when the analyzer is connected.

<Wi-Fi>



“Host name”

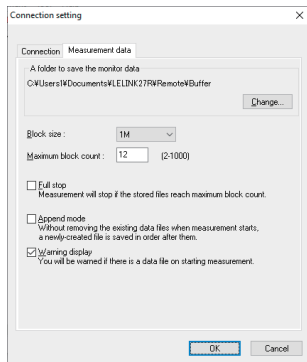
Set the IP address of the analyzer.

“Data Port”

Set the port number for the send/receive of the measured data. Set the same port number set to the analyzer.

- Measurement Tab

Setting for the saving destination of the measured data, file size, and behavior in the protocol analyzer mode.



[A folder to save the monitor data]

This folder is for saving the measured data.
To change the settings, click “Change”.
Then the window to select a folder will be appeared. Select the proper folder and click “OK”. The file name of saving data is started from “00000000.DT” in numerical order.

- * Recommend specifying an exclusive folder.
- * Specify a drive, which has enough capacity.
(When it does not have enough capacity, the PC may not operate correctly.)

Attention: If there is not any folder in the place you specified, a message dialog will be appeared.

[Block Size]

Set the data capacity per a file. You can select from 128K/1M/2M/4M/8M/16M/32M byte.

[Maximum Block Count]

Set the maximum file number to save. You can set from 2 to 1000. When the number of the data file exceeds this number, the data file with the lower number will be deleted.

[Full Stop]

If the stored files reach to the maximum block number, it will stop measurement automatically. If you do not select it, the analyzer records data continuously as a ring buffer.




[Append Mode]

When measurement starts, a newly-created file is saved in the order after the existing files. If the number of the whole data files exceed the maximum block number, a data file with the lower number (includes data files which were saved on the former measurement) will be deleted even in the append mode. If you do not select it, the former data will be deleted and start the file name from “00000000.DT”.

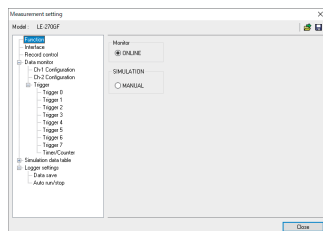
[Warning Display]

It warns that there is the former data in the file you specified as a saving file.

■ Analyzer Settings

Click  on the tool bar of the data window (or click “Measurement” -> “Measurement setting”) to set the target bus, speed and so on. On the measurement setting window, every time you change the setting on the left side of the window, the contents of the setting (on the right side of the window) will be changed. Click  to save the configuration as a “.SU” file. Click  to read the configuration file.

● Function



Select the mode of the analyzer.

[ONLINE] (Online mode)

This mode monitors CAN/CAN FD and LIN data along with the analog value and logical status (EXIN1 to EXIN4). The relationship between external signals and communication data are clearly visualized.

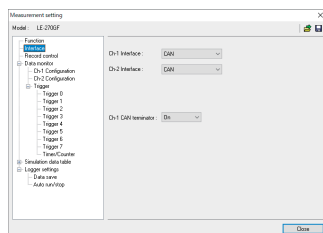
 4.5 Analog measurement settings

“MANUAL” (Simulation mode)

It outputs the data which already set to the simulation data table from CH1(CAN1/LIN1).

“Schedule” Schedule setting for the analyzer when it is LIN master.

● Interface



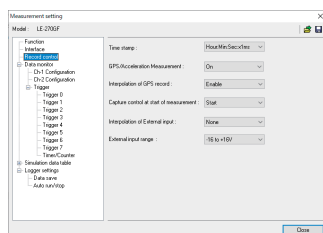
Ch-1 interface/Ch-2 interface

Select the interfaces of CH1 and CH2 from CAN or LIN. When measuring CAN-FD, select CAN.

Ch-1 CAN terminator

You can connect the terminal end (120Ω) to the CAN port side of the Ch-1 in the analyzer.

● Record Control



Set the Time stamp resolution selection, ON/OFF of GPS/Acceleration Measurement^(*),

Interpolation of GPS record^(*), Capture control at the start of measurement, Interpolation of External input^(**), and External input range.

*1: LE-270AF cannot measure GPS/Acceleration function.

*2: When “Interpolation of GPS record” is selected, GPS positioning data measured approximately every second is copied and recorded to all communication frames captured faster than that period. GPS and acceleration measurement functions are only available on LE-270GF. .


 4.5 Analog measurement settings

● Data Monitor

[Configuration] Set the speed of target devices.

[Trigger] Set the trigger conditions and actions.

 4.1 Communication Condition

 7.1 Trigger Function

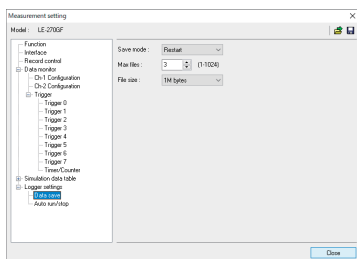
- Simulation data table

[Table 0 to F] Set the frame to be sent.

For LIN, set the response field data, and for master simulation, set the header field ID in the request ID table on the function selection screen.

5.1 Preparation of Simulation

- Logger Setting



[Data Save]

Set the file size and number of files to save for a Data Logger Mode.

Chapter 8 Data Logger Mode

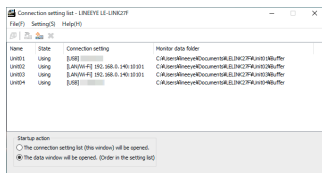
[Auto RUN/STOP]

Set the starting time and ending time of the auto-measurement.

8.4 Auto Run/Stop Function

3.3 Multiple analyzer connections

To connect and use multiple analyzers at the same time, register the number of analyzers in the Connection Setting List window.



To register, click the [] button on the toolbar of the Connection Settings List window (or click [Connection Settings] -> [Settings] in the menu).

The Connection Setting window similar to the Data window will open and the settings are configured.

3.2 Configuration of Analysis Software

Select the connection settings and click on the [] button on the toolbar (or [File]->[Open data window]

in the menu).

The data window will open.

To delete a connection setting, select it and click the [X] button (or the menu item [Setting] -> [Delete Setting]).

The connection setting list (this window) : The connection settings list window will be opened at the next startup.


The data window will be opened.

(Order in the setting list)

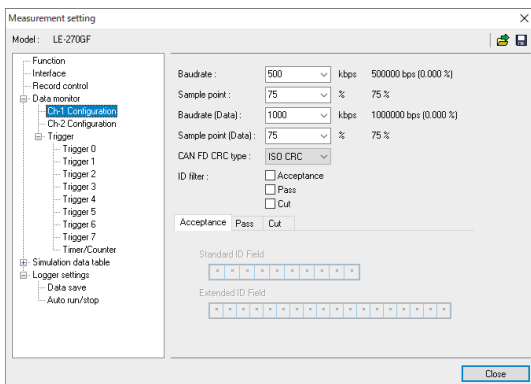
: The data window will be opened at the next startup in the order of the list of connection setting.

The monitor function records communication data in the files automatically without affecting the communication lines. The results are displayed as CAN, CAN FD and LIN frames. Not only communication data but also the time stamp and external signals are recorded, thus the error time and conditions of external equipment are clear to see. Also, the trigger function, which detects specific communication, can be set. Moreover, LE-270GF can obtain positioning by GPS receiver and acceleration information by acceleration sensor.

4.1 Communication Condition

Click “” on the tool bar of the data window (or click “Measurement” -> “Measurement setting”). Set the communication condition for target devices.

<CAN setting>



- Baud rate / Baud rate (Data)

Select the speed (125K to 1000K) for CAN and CAN FD, or input the speed directly.

* Applicable rate by the circuit is automatically set. If the tolerance rate appeared on the right side is big, it is possible that the analyzer cannot measure well.

* Select the “Baud rage (data)” for CAN FD data phase (1000K to 5000K), or input the speed directly.

- Sample point / Sample point (Data)

Select the bit sample point within 60% to 90% , or input directly.

* If inputting the number directly, the actual setting number will be displayed on the right side.

* Sample point (data) is for CAN FD data phase.

- CAN FD CRC type

Select the CRC type for CAN FD from “ISO CRC” or “non-ISO CRC”.

- ID filter

Sets whether capture filtering by ID is used or not.

Multiple selections can be made from "Acceptance," "Pass," and "Cut..

- Acceptance

It captures a corresponding ID frame by the hardware filter.

Hardware filter, captures frames with matching ID.

In the Acceptance Settings tab, set the standard field ID (bits 10-0/29-18) and the extended field ID (bits 17-0) bitwise ("0", "1", "*" (don't care)).

(Example) Capturing a frame whose extended format ID is 00000023h (HEX).

Standard ID Field : 000000000

Extended ID Field : 00000000000100011

(Example) Capturing a frame whose extended format ID is 00000023h (HEX).

Standard ID Field : 00000100011

Extended ID Field : *****

Note: In an environment with mixed extended formats, 008C0000h to 008FFFFFh are also captured.

- PASS

It captures a corresponding ID frame by the software filter.

At the pass setting tab, select the standard format or the extended format and then set the ID by HEX ("0" to "F", "*" (Don't Care)). (You can set up to 8)

When standard format, set the values from ID:0 to 7FFh. When extended format, set the values from ID:0 to 1FFFFFFFh.

Note: If all checkboxes are unchecked (disabled) when the pass filter is enabled, all ID frames will not be captured.

(Example) When capturing frames with standard format IDs from 010h to 01Fh.

Acceptance	Pass	Cut
<input checked="" type="checkbox"/> 1: Standan	01*	<input type="checkbox"/> 5: Standan
<input type="checkbox"/> 2: Standan		<input type="checkbox"/> 6: Standan
<input type="checkbox"/> 3: Standan		<input type="checkbox"/> 7: Standan
<input type="checkbox"/> 4: Standan		<input type="checkbox"/> 8: Standan

- Cut

It does NOT capture the frames which have corresponding ID by a software filter.

Select standard format of extended format at the cut configuration tab and set the ID by HEX ("0" - "F", "*" (Don't care)). (You can set up to 8 items)

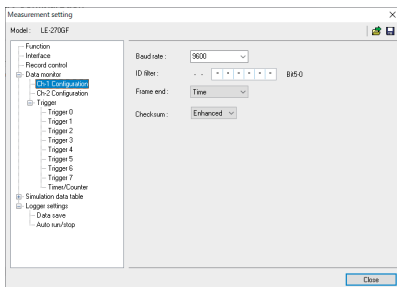
Configure values within the scope of ID:0 - 7FFh when it is standard format, and configure values within the scope of ID:0 - 1FFFFFFFh when it is extended format.

Note: If all checkboxes are unchecked (disabled) when the cut filter is enabled, all ID frames will be captured.

(Example) If you do not capture frames with standard format IDs from 020h to 02Fh

Acceptance	Pass	Cut
<input checked="" type="checkbox"/> 1: Standan	02*	<input type="checkbox"/> 5: Standan
<input type="checkbox"/> 2: Standan		<input type="checkbox"/> 6: Standan
<input type="checkbox"/> 3: Standan		<input type="checkbox"/> 7: Standan
<input type="checkbox"/> 4: Standan		<input type="checkbox"/> 8: Standan

<LIN setting>



● Baud Rate

Select from 2400bps, 9600bps or 19200bps.

Also, it is possible to set an arbitrary speed. (Any four digits between 400bps to 260000bps.)

● ID Filter

Set the ID filter settings. Set the 5 to 0 bits of ID as "0", "1", or "*" (Don't Care).

Only frames with matching IDs are captured.

If all bits are set to "*" (don't care), no filtering will be performed.

(Example) Display frames of ID 00

- - 0 0 0 0 0 0

(Example) Display frames of ID 01

- - 0 0 0 0 0 1

(Example) Display frames of ID 00 or 01

- - 0 0 0 0 0 *

● Frame End

Select whether frames are terminated in "time" (the maximum value in the standard) or "DLC" (data length per ID).

Normally, "DLC" is selected. If "DLC" is selected, the DLC and checksum calculation method can be set for each ID.

● Checksum

Checksum has to be set only when Time is selected in the Frame End setting.

Select the method of calculating checksum from Classic or Enhanced.

* ID 3Ch-3Fh have to be calculated by "Classic".


● DLC setting

00-0F	10-1F	20-2F	30-3F
DLC	Checksum	DLC	Checksum
ID00: 2 ▼ Classic ▼	ID08: 2 ▼ Classic ▼	ID00: 2 ▼ Classic ▼	ID08: 2 ▼ Classic ▼
ID01: 2 ▼ Classic ▼	ID09: 2 ▼ Classic ▼	ID01: 2 ▼ Classic ▼	ID09: 2 ▼ Classic ▼
ID02: 2 ▼ Classic ▼	ID0A: 2 ▼ Classic ▼	ID02: 2 ▼ Classic ▼	ID0A: 2 ▼ Classic ▼
ID03: 2 ▼ Classic ▼	ID0B: 2 ▼ Classic ▼	ID03: 2 ▼ Classic ▼	ID0B: 2 ▼ Classic ▼
ID04: 2 ▼ Classic ▼	ID0C: 2 ▼ Classic ▼	ID04: 2 ▼ Classic ▼	ID0C: 2 ▼ Classic ▼
ID05: 2 ▼ Classic ▼	ID0D: 2 ▼ Classic ▼	ID05: 2 ▼ Classic ▼	ID0D: 2 ▼ Classic ▼
ID06: 2 ▼ Classic ▼	ID0E: 2 ▼ Classic ▼	ID06: 2 ▼ Classic ▼	ID0E: 2 ▼ Classic ▼
ID07: 2 ▼ Classic ▼	ID0F: 2 ▼ Classic ▼	ID07: 2 ▼ Classic ▼	ID0F: 2 ▼ Classic ▼

This setting is displayed only when selecting "DLC" for "frame end". Select the data length (0 to 8byte) for each frame and select the Checksum (Classic or Enhanced).

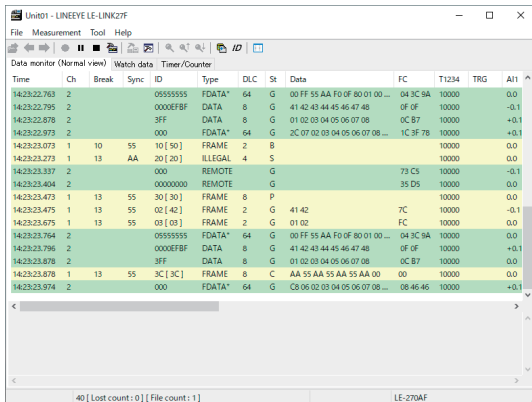
4.2 Start and Stop Measurement.

■ Start Measuring

Click “” on the tool bar of data window (or click “Measurement” -> “Run measurement”).


Received data can be displayed on the Data monitor display (normal view) at real time while monitoring.*¹


Only specified ID frames can be displayed at Watch Data display.




Time	Ch	Break	Sync	ID	Type	DLC	St	Data	FC	T1234	TRG	Alt
14:23:22.763	2			05555555	FDATA*	64	G	00 FF 55 AA F0 0F 80 01 00 ...	04 3C 9A	10000		0.0
14:23:22.795	2			0000E8BF	DATA	8	G	41 42 43 44 45 46 47 48	0F 0F	10000		-0.1
14:23:22.878	2			3FF	DATA	8	G	01 02 03 04 05 06 07 08	0C 87	10000		+0.1
14:23:22.973	2			000	FDATA*	64	G	2C 07 02 03 04 05 06 07 08 ...	1C 3F 78	10000		+0.1
14:23:23.073	1	10	55	10 [50]	FRAME	2	B			10000		0.0
14:23:23.273	1	13	AA	20 [20]	ILLEGAL	4	S			10000		0.0
14:23:23.337	2			000	REMOTE	G			73 C5	10000		-0.1
14:23:23.404	2			00000000	REMOTE	G			35 D5	10000		0.0
14:23:23.473	1	13	55	30 [30]	FRAME	8	P			10000		0.0
14:23:23.475	1	13	55	02 [42]	FRAME	2	G	41 42	7C	10000		-0.1
14:23:23.675	1	13	55	03 [03]	FRAME	2	G	01 02	FC	10000		0.0
14:23:23.764	2			05555555	FDATA*	64	G	00 FF 55 AA F0 0F 80 01 00 ...	04 3C 9A	10000		0.0
14:23:23.796	2			0000E8BF	DATA	8	G	41 42 43 44 45 46 47 48	0F 0F	10000		+0.1
14:23:23.878	2			3FF	DATA	8	G	01 02 03 04 05 06 07 08	0C 87	10000		0.0
14:23:23.878	1	13	55	3C [3C]	FRAME	8	C	AA 55 AA 55 AA 55 AA 00	00	10000		0.0
14:23:23.974	2			000	FDATA*	64	G	C6 06 02 03 04 05 06 07 08 ...	08 46 46	10000		+0.1

* If you specify the sampling interval (1ms to 10 seconds) for Interpolation of External input, the analog waveform display screen will be displayed.





 4.4 Watch Data Display

 4.5 Analog measurement settings

■ Stop updating the display

Click “” on the tool bar in the data window, or press “space” key to stop updating the display. Latest data can be displayed on the Data monitor (normal view) display.

■ Stop Measuring

Click “” on the tool bar of data window (or click “Measurement” -> “Stop measurement”). It is able to scroll data after the measurement in the Data Monitor display. Data will be saved into the specified folder set in the configuration settings. To open the previous files, click “” (or “File” -> “Data file”) and specify the file. To open the sequential order files, click “” or “”.

* Please make sure that power saving mode of the PC does not cut USB connection. It will end the measurement of analyzer.

4.3 Data monitor display

Unit01 - LINEEYE LE-LINK27F

File Measurement Tool Help

Data monitor (Normal view) Watch data Timer/Counter Analog wave

Time	Ch	Break	Sync	ID	Type	DLC	St	Data	FC	T1234	TRG	AI1
10:08:20.115	1	13	AA	20 [20]	ILLEGAL	4	S			10100		0.0
10:08:20.217	2			000	FDATA*	64	G	00 01 02 03 04 05 06 07 08 ...	10 E4 BF	10100		+0.1
10:08:20.315	1	13	55	30 [30]	FRAME	8	P			10100		0.0
10:08:20.320	1	13	55	02 [42]	FRAME	2	G	41 42	7C	10100		0.0
10:08:20.448	2			7FF	DATA	8	G	01 02 03 04 05 06 07 08	4A E2	10100		0.0
10:08:20.520	1	13	55	03 [03]	FRAME	2	G	01 02	FC	10100		0.0
10:08:20.576	2			000	REMOTE		G		36 5C	10100		0.0
10:08:20.727	1	13	55	3C [3C]	FRAME	8	C	AA 55 AA 55 AA 55 AA 00	00	10100		0.0
10:08:20.857	2			0000EFBF	DATA	8	G	41 42 43 44 45 46 47 48	0F 0F	10100	T	0.0
10:08:20.886	2			00000000	REMOTE		G		41 D2	10100		0.0
10:08:20.940	2			05555555	FDATA*	64	G	00 FF 55 AA 0F F0 80 01 00 ...	00 24 86	10100		0.0
10:08:21.064										10100		0.0
10:08:21.115	1	10	55	10 [50]	FRAME	2	B			10100		0.0
10:08:21.217	2			000	FDATA*	64	G	00 01 02 03 04 05 06 07 08 ...	10 E4 BF	10100		+0.1
10:08:21.315	1	13	AA	20 [20]	ILLEGAL	4	S			10100		0.0
10:08:21.448	2			7FF	DATA	8	G	01 02 03 04 05 06 07 08	4A E2	10100		0.0
10:08:21.515	1	13	CC	30 [30]	FRAME	8	D			10100		0.0

00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F 0123456789ABCDEF

00 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
 10 10 11 12 13 14 15 16 17 18 19 1A 1B 1C 1D 1E 1F
 20 20 21 22 23 24 25 26 27 28 29 2A 2B 2C 2D 2E 2F
 30 30 31 32 33 34 35 36 37 38 39 3A 3B 3C 3D 3E 3F
 0123456789; ; <=> ?

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Unit01 - LINEEYE LE-LINK27F

File Measurement Tool Help

Data monitor (Normal view) Watch data Timer/Counter Analog wave

Quality	Latitude	Longitude	Altitude	Geoid	UTC	X	Y	Z
GPS 5	34 58.82288 N	135 43.96976 E	+24.0	+34.2	04:23:41 26/07/24	+0.020	-0.020	+1.053
GPS 5	34 58.82305 N	135 43.96983 E	+23.5	+34.2	04:23:42 26/07/24	+0.024	-0.017	+1.053
GPS 5	34 58.82321 N	135 43.96977 E	+23.0	+34.2	04:23:43 26/07/24	+0.018	-0.015	+1.053
GPS 6	34 58.82331 N	135 43.96968 E	+22.4	+34.2	04:23:44 26/07/24	+0.019	-0.021	+1.053
GPS 6	34 58.82341 N	135 43.96963 E	+22.0	+34.2	04:23:45 26/07/24	+0.023	-0.021	+1.051
GPS 6	34 58.82350 N	135 43.96952 E	+21.6	+34.2	04:23:46 26/07/24	+0.022	-0.020	+1.050
GPS 6	34 58.82355 N	135 43.96940 E	+21.1	+34.2	04:23:47 26/07/24	+0.022	-0.018	+1.051
GPS 6	34 58.82360 N	135 43.96935 E	+20.6	+34.2	04:23:48 26/07/24	+0.019	-0.018	+1.046
GPS 6	34 58.82372 N	135 43.96929 E	+20.2	+34.2	04:23:49 26/07/24	+0.024	-0.017	+1.055
GPS 6	34 58.82379 N	135 43.96920 E	+19.8	+34.2	04:23:50 26/07/24	+0.023	-0.020	+1.055
GPS 6	34 58.82382 N	135 43.96913 E	+19.3	+34.2	04:23:51 26/07/24	+0.023	-0.021	+1.059
GPS 6	34 58.82383 N	135 43.96905 E	+18.9	+34.2	04:23:52 26/07/24	+0.024	-0.019	+1.049
GPS 6	34 58.82383 N	135 43.96900 E	+18.5	+34.2	04:23:53 26/07/24	+0.020	-0.018	+1.052
GPS 6	34 58.82382 N	135 43.96897 E	+18.2	+34.2	04:23:54 26/07/24	+0.023	-0.018	+1.056
GPS 6	34 58.82379 N	135 43.96888 E	+17.8	+34.2	04:23:55 26/07/24	+0.023	-0.016	+1.055
GPS 6	34 58.82371 N	135 43.96878 E	+17.3	+34.2	04:23:56 26/07/24	+0.020	-0.014	+1.052
GPS 6	34 58.82364 N	135 43.96874 E	+16.9	+34.2	04:23:57 26/07/24	+0.020	-0.015	+1.054

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Display	Meaning
Time	Displays the time (time stamp) when the frame is received.
deltaT	Displays the difference of time stamps compared to their previous time stamp.
Ch	Displays the channel received. (1: CH1, 2: CH2)
Break	Displays the number of bit for Synch Break width for LIN. (Not displayed in CAN/CAN FD.)
Sync	Displays LIN Synch Field. (Not displayed in CAN/CAN FD.)
ID	CAN/CAN FD: Displays the received frame ID in HEX. LIN: Displays the Identifier excepting the upper two bit. And displays the Identifier with parity in []. Example: 11110101b -> 35 [F5]
Type	Displays the types of received frame. Data : Data frame of CAN/CAN FD Remote : Remote frame of CAN FData : CAN FD frame with BRS=0 and ESI=0 FData! : CAN FD frame with BRS=0 and ESI=1 FData* : CAN FD frame with BRS=1 and ESI=0 FData*! : CAN FD frame with BRS=1 and ESI=1 Error : Error frame of CAN/CAN FD Frame : Frame of LIN Illegal : Illegal frame of LIN
DLC	CAN/CAN FD: Displays the contents of the data length code (number of data bytes) in decimal. LIN : Displays the data length which is set by Configuration in decimal. (Not displayed when "Frame end" is set to "Time" in the configuration.)
St	Displays whether the condition of the frame is normal or abnormal. G : Normal frame B : SynchBreak error of LIN. (Dominant is 10 bit) S : SynchField error of LIN.(other than 55h) P : Parity error of LIN. L : Data length error of LIN. (When "Frame End" setting is "DLC"). R : When the data of the Response of LIN is less than 1 byte. C : Checksum error of LIN or CRC error of CAN/CAN FD. A : ACK error of CAN/CAN FD. E : Error frame of CAN/CAN FD. F : Form error of CAN/CAN FD. (When CRC or ACK delimiter is "0")
Data	Displays the contents of data field in HEX.
FC	Displays the CAN/CAN FD CRC or LIN checksum value in hexadecimal.
T1234	Displays the digital value of external input TRG IN/EXIN1/EXIN2/EXIN3/EXIN4. TRG IN : Pulled up with +5V 10KΩ, so when not connected, 1. EXIN1 ~ EXIN4 : 1 at 2.2V or above.
TRG	Displays the frames which satisfied the trigger conditions.
All to 4	Displays the analog of external input EXIN1/EXIN2/EXIN3/EXIN4.(-16.0V ~ +16.0V)/(0V ~ 32V).
Quality ^{*1}	Accuracy of the GPS invalid : The data received from the GPS module is invalid. (The invalid range is Latitude, Longitude, Altitude, and Geoid. It does not include UTC) GPS : The data received from the GPS module is GPS positioning data. (Valid data) The value on the right side means the number of satellites used for the positioning (upto 9). Blank : When it cannot receive from the GPS module. Latitude, Longitude, Altitude, Geoid, and UTC will be blanks too.
Latitude ^{*1}	Degrees of latitude by GPS (degree, minute, N/S)
Longitude ^{*1}	Degrees of longitude by GPS (degree, minute, E/W)
Altitude ^{*1}	Sea level altitude of GPS antenna (m)
Geoid ^{*1}	Geoid height of GPS
UTC ^{*1}	Coordinated Universal Time by GP (Hour:Minute:Second, Year/Month/Day) Year is displayed by two lower digits.
X ^{*1}	X axis (g) from the acceleration sensor module (±8G)
Y ^{*1}	Y axis (g) from the acceleration sensor module (±8G)
Z ^{*1}	Z axis (g) from the acceleration sensor module (±8G)

*1: These items are blank for LE-270AF. These items will be blank when you set OFF to “GPS/Acceleration setting” at record control setting.

It might be displayed if selecting “GPS interpolation” function, even though nothing will be received from GPS module.

- Other Display

Display	Meaning
()	Framing error (When the stop bit is Dominant.) e.g. (01)
LOSTDATA	Displayed in “Ch” field. It means there is lost of data while transmitting into PC.
CAPTURESTOP	Displayed in “Ch” field. It means capturing function is not running.
OVERRUN	Displayed in “Ch” field. It means the buffer in the analyzer becomes full while measuring.

- Data detail display section

Displays only the data field of the selected CAN/CAN FD or LIN frame in hexadecimal.

- Data position display section

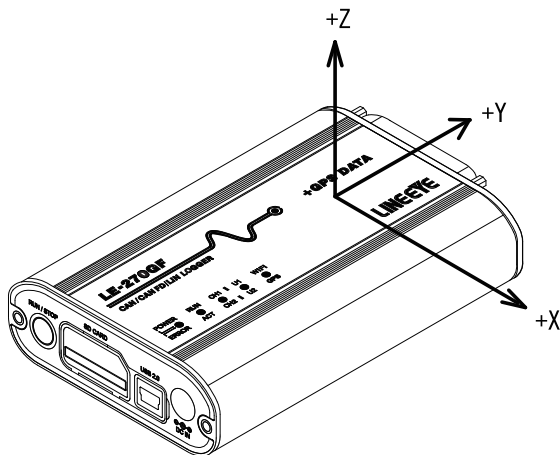
It displays the number of data loss (Analyzer cannot save data in the SD card or HDD of PC because of the baud rate and large amount of data) while measuring. “LOSTDATA” will be displayed in the monitor display.

After the measurement, it will display the position of top of data displayed in the monitor display.

If the Capture Control Trigger stops capturing, “Capture stopping ...” will be displayed.

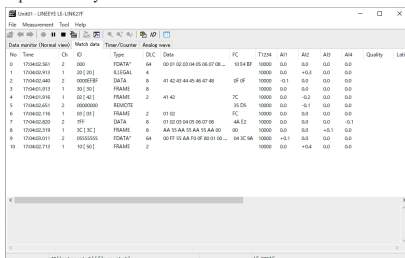
- * The direction of the acceleration sensor is as in the picture below. The upper side gives plus value.

For example, when the side of the Dsub25 port is the upper side (in other words, when RUN/STOP button side is the bottom side), Y value will be plus and the X and Z values will be 0.



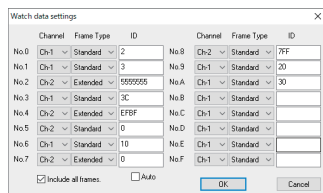
4.4 Watch Data Display

At the Watch Data display, only specific ID frames can be displayed. Only the latest data will be displayed and it is updated every one second.



■ Setting of Watch Data Display

Click “ID” on the tool bar of the data window (or “tool” -> “Watch Data settings”). Set the target channels and ID.



● Channel

Select the measurement port from “Ch-1” or “Ch-2”.

● Frame type

Select the frame type from “Standard” (CAN standard format, LIN) or “Extended” (CAN expansion format).

● ID

Set the frame ID in HEX. The one set in here will be displayed in the Watch Data display.

CAN standard format: 0-7FFh

CAN expansion format: 0-1FFFFFFFh

LIN: 0-3Fh

● Include all frames

Uncheck : It displays normal CAN data frames that matched with ID setting (No.1 to F), or frames with LIN response data.

Check : It displays all frames that matches with ID setting including remotes and errors. (It cannot find the error status in the Watch Data Display.)

● Auto

Uncheck : It displays frames that matched with the ID setting (No.0 to F) on the Watch Data Display. Column number (No.) of Watch Data Display turns to be 0 to F.

Check : It displays frames in the order of monitoring on the Watch Data Display. (Setting on No.0 to F will be ignored). Column number (No.) of Watch Data Display turns to be the monitor ordering number (0 to 99).

Note: It clears by pushing “OK” after changing it.

*Cannot edit or print the watch data display.

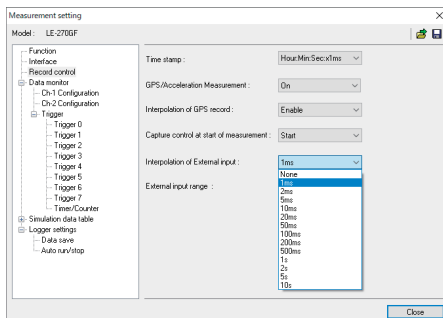
*Watch Data display will be erased when starting the measurement.

4.5 Analog measurement settings

Display the analog waveform at the specified sampling cycle.

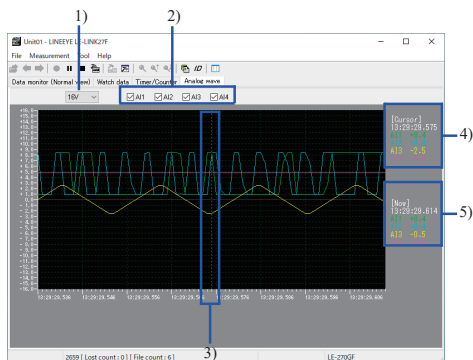
■ Analog mode setting

On “Interpolation of External input” of “Measurement setting”, set “None” (only for when capturing communication frame) or 1ms to 10s (periodic recording).



<Analog Waveform Display>

Analog waveform will be displayed only monitoring at Analog mode or displayed data measured by Analog mode.



- 1). Maximum display voltage
Maximum display voltage can be selected from 1V, 2V, 5V, 10V, 16V or 32V.
 - 2). Display/Undisplay the graph of AI1 - 4
The graph of checked AI is displayed.
 - 3). Cursor
The cursor (red dotted line) on a graph can be moved to right and left by the mouse or a Shift + arrow key.
 - 4). The voltage value of the cursor position
The voltage value of the cursor position on the graph (AI1 - 4) would be displayed on the upper right ([Cursor]) of a graph.
 - 5). Display the present voltage value
During Analog mode, the latest value would be displayed on the right ([Now]) of a graph and be updated every 1 second.
- * When displaying the stored data, a scroll bar is appeared and it enables scrolling back to the past data.

The simulation function performs a transmission/reception test according to the protocol as a communication partner of the device when the other device is not prepared at the initial stage of development. For CAN/CAN FD, the data registered in the simulation data tables (0 to F) can be sent with one touch on the operation panel.

For LIN, there are “Master” and “Slave” mode. When selecting the “Master” mode, send the pre-registered headers (max. 16) in the orders from the control panel by one click or automatically. When selecting the “Slave” mode, the response data is sent automatically after receiving the same header ID from the master, matched with the one in the simulation data table (0 to F).

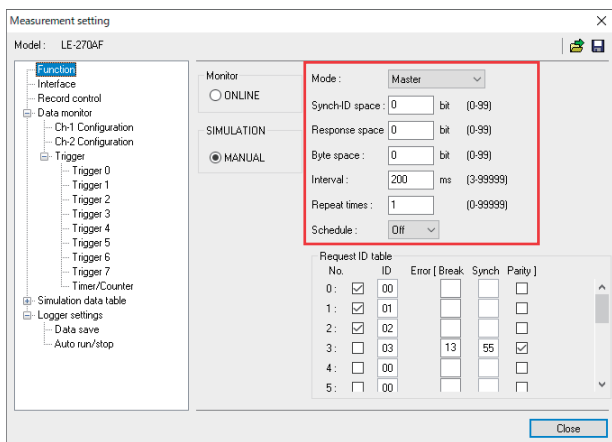
* Only Ch-1 is available for simulation.

* For CAN/CAN FD, ACK will be sent automatically for every frame. (The simulation port acts as a node.)

* For more details, refer to the online help (“Help” -> “Contents”) on the PC software “LE-LINK27F”.

5.1 Preparation of Simulation

Click “Function” -> “MANUAL” -> “Interface”, and select “CAN” or “LIN” for “Ch-1”. For LIN, select “Master” or “Slave” when selecting the MANUAL simulation mode.



- Mode
Select “Master” or “Slave” for LIN simulation.
- Sync-ID space (for Master)
When selecting the Master mode, set the interval between the synch field and ID field (0 to 99bit).
- Response space (for Master)
When selecting the Master mode, set the interval between the header and response (0 to 99bit).
- Byte space
Set the interval between the response and data (0 to 99bit).
- Interval (for Maser)
Set the interval (3 to 99999msec) of transmitting frames using the Schedule function. Set longer value than the frame length.

- Repeat number (for Master)

Set the number of times (0 to 99999) that the frame is sent repeatedly using the Schedule function (The header set in the request ID table). If “0” is set, the transmission will continue endlessly. (The Schedule function has to be “ON”).

- Schedule (for Master)

ON : Transmit the LIN header including the valid ID set in the request ID table automatically in the order of table number.

OFF : Transmit the LIN header including the valid ID set in the request ID table when corresponding key (0 to F) of request ID table is pressed. This function is not available for logger mode.

5.2 Simulation Table Setting

Click “Measurement”-> “Measurement setting” on the menu bar, and set the data to be sent to each table 0 to F of the simulation data table.

- Simulation data table

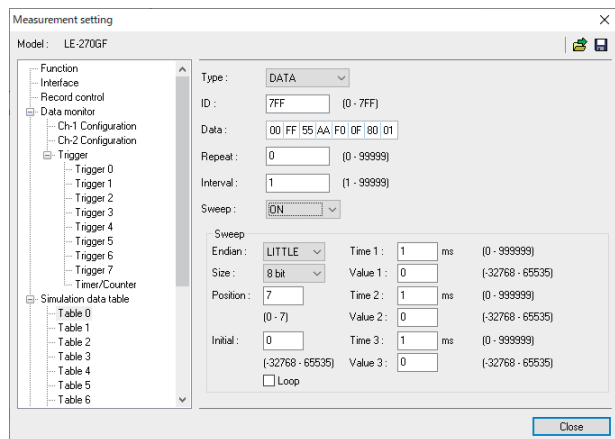
A simple list of the settings of each table 0 to F is displayed.

- Table 0 ~ F

Set the data to be sent to 0 to F (maximum 16) in each table. The data format to be set differs depending on the protocol (CAN or LIN) set for the Ch-1 interface.

5.3 CAN Table Setting

Set the simulation data table (0 to F) used for CAN simulation.










- Type

Select the frame type.

Type	Description
DATA	CAN standard format data frames
EX-DATA	CAN Extended format data frames
REMOTE	CAN standard format remote frames
EX-REMOTE	CAN Extended format remote frames
FD DATA	CAN FD standard format data frames
FD EX-DATA	CAN FD Extended format data frames

- ID
Enter the ID by HEX with 11 bits (when it is standard format) or 29 bits (when it is extended format).
Standard format : 000 to 7FFh
Extended format : 00000000h to 1FFFFFFFh
- Data (When data (standard/extended) or FD data (standard/extended) is selected)
Displayed when Data (Standard/Extended) or FD Data (Standard/Extended) is selected for Frame Type.
When Data (Standard/Extended) is selected, enter the maximum 8 bytes of data in the data field in hexadecimal.
When FD Data (Standard/Extended) is selected, the set first 8 bytes of data are displayed in hexadecimal. The setting is entered by editing the data.
- Edit data table (When FD data (standard/extended) is selected)
This is displayed when FD data (standard/extended) is selected for the frame type.
Click the "Edit Data Table" button to display the data table edit screen, Enter the maximum 64 bytes of data in the data field in hexadecimal.

Toolbar	Meaning
	Switches between hexadecimal and ASCII display.
	Switches between hexadecimal and ASCII input.
	Cuts the selected text.
	Copies the selected characters.
	Cut or paste the copied text.
	Input data from "Begin data" to "End data" for the number of characters in "Data size". [Begin data] > [End data]: Input the number of characters from [Begin data] + 1. [Begin data] < [End data]: Input the number of characters from [Begin data] by [-1].
	Delete all data in the table.

- BRS (When FD data (standard/extended) is selected)
To change the communication speed of the CAN FD data field, check the box.
- DLC (When Remote (standard/extended) is selected)
Displayed when Remote (Standard/Extended) is selected in Frame Type.
Enter the number of bytes of data to be requested in decimal.
The value can be set from 0 to 8 bytes.
- Repeat
Enter how much it repeats the transmission of frame by decimal.
The range should be from 0 to 99999.
It continues transmitting repeatedly when you set 0.
- Interval
Enter the interval of the time of repeat transmission by decimal.
The range should be from 0 to 99999msec.
- Sweep
It appears when you select the frame type of "data frame" at "Type".
Select presence or absence of data sweep (continuous change).
ON : With sweep
OFF : Without sweep

5.4 Sweep setting

When Sweep is ON, set the following.

◆ Endian

Select the storage order (LITTLE, BIG) of the data to be swept.

For example, if 0123h is set, each byte order will be as follows.

BIG:

01h	23h
-----	-----

 LITTLE:

23h	01h
-----	-----

◆ Size

Select the size of the data to be swept from 8 bits and 16 bits.

Overflowed bits are ignored. For example, when 8-bit is selected and the data to be swept is 256(100h), it is set to 00h.

◆ Position

Sets the position of the data field where you want to insert the data to be swept.

For example, if the size is 16bit and the position is 2, the gray part will change (sweep).



The data set in the data item (up to 8 bytes) is sent except for the set position.

◆ Initial

Set the initial value of the data to be swept in decimal (-32768 to 65535).

◆ Time 1 ~ 3

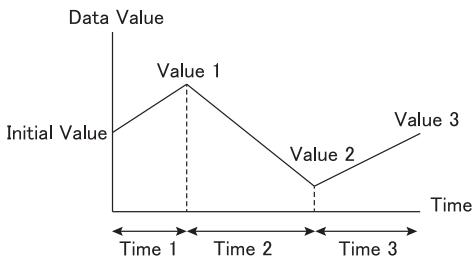
Set the time to change to the target value (values 1 to 3) in decimal (0 to 999999msec).

For example, it changes to the target value (value 1) during the time 1.

◆ Value 1 ~ 3

Set the target value in decimal (-32768 to 65535).

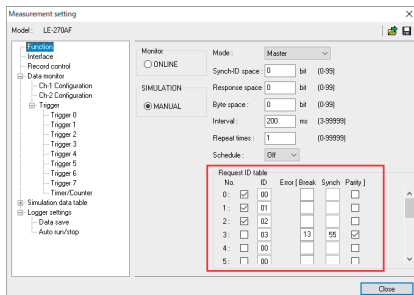
The relationship between the target value (values 1 to 3) and time (time 1 to 3) is as follows.



◆ Loop

When checked, the sweep operation is repeated.

5.5 LIN request ID table setting (for Master)

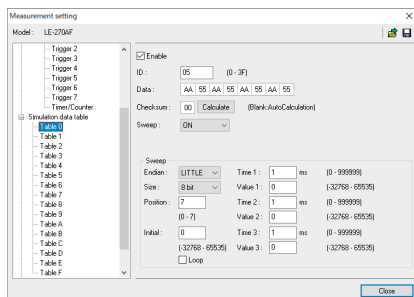


Set the header in the request ID table for LIN Master simulation.

- ID
Set the header ID for the PID filed in HEX. Mark on the box (0 to F) to enable the setting. Set the response in the simulation data table.
- Break error
Set the error for the break field (0 to 99). 13bit will be set automatically if inputting nothing.
(Attention: The break signal should be the max 6ms. Set the appreciable bit.)

- Synch error
Set the error for synch field in HEX. "55h" will be set automatically if inputting nothing.
- Parity error
Mark on the box to send the parity error in that frame. Inverted value of the parity will be sent as the error.

5.6 LIN table (Response data) setting



Set the transmission data in the response filed (simulation data table 0 to F) for LIN Master/Slave simulation.

- Enable
If checked, the response is automatically sent when the ID in the received header matches the ID you set.
If unchecked, the response is not sent even if the IDs match.
- ID
Set the ID to be responded (excluding parity) in hexadecimal (00h to 3Fh).

< Caution >

When it is in slave simulation, data of the smaller table number will be sent if the ID of the table 0 to F is redundantly set.

- Data
Input the data by HEX up to 8 bytes.
- Checksum
Set the checksum by HEX.
When nothing is input, it transmits calculating automatically by the checksum method set at Ch-1 configuration.
By pushing [Calculate], you can set the value calculated by the checksum method set at Ch-1 configuration.
- Sweep
Select ON/OFF of sweeping data (changing continuously).

5.7 CAN Simulation

■ Start the Simulation

1. Click “Run measurement” to open the operation panel.

Table 0	DATA	7FF	D1 D2 D3 D4 D5 D6 D7 D8
Table 1	EX-DATA	1FFFFFFF	D9 DA DB DC DD DE DF 10
Table 2	REMOTE	000	
Table 3	EX-REMOTE	00000000	
Table 4	FD DATA	001	11 12 13 14 15 16 17 18 ...
Table 5	FD EX-DATA	00000001	51 52 53 54 55 56 57 58 ...
Table 6	FD DATA	002	91 92 93 94 95 96 97 98 ...
Table 7	FD EX-DATA	00000002	D1 D2 D3 D4 D5 D6 D7 D8 ...

Table 8	DATA	000	
Table 9 <td>DATA<td>000</td><td></td></td>	DATA <td>000</td> <td></td>	000	
Table A <td>DATA<td>000</td><td></td></td>	DATA <td>000</td> <td></td>	000	
Table B <td>DATA<td>000</td><td></td></td>	DATA <td>000</td> <td></td>	000	
Table C <td>DATA<td>000</td><td></td></td>	DATA <td>000</td> <td></td>	000	
Table D <td>DATA<td>000</td><td></td></td>	DATA <td>000</td> <td></td>	000	
Table E <td>DATA<td>000</td><td></td></td>	DATA <td>000</td> <td></td>	000	
Table F <td>DATA<td>000</td><td></td></td>	DATA <td>000</td> <td></td>	000	

WakeUp(0Oh) WakeUp Stop repeated sending

* The operation panel does not open when measurement is stopped or in the online mode .

* Please use the simulation by the trigger because this cannot be used in the communication logger mode.

2. Click the button of the table number to be transmitted.
3. If you want to stop the data transmission for which the repeat is set during transmission, click the “Stop repeated sending” toggle button, and then click the table number button for which you want to cancel transmission in succession. After that, click the “Stop repeated sending” toggle button to return the button to the original state.

■ Stop the Simulation

1. Close the operation panel.
2. Execute “Stop measurement”.

< Caution >

When there is no ACK response from other nodes on the CAN bus or when there is a frame transmission, the data cannot always be transmitted exactly as the button is clicked.

In addition, the data may not be sent due to factors such as overlapping time of multiple table settings.

When there is no ACK response, the same data will continue to be sent regardless of the repeat setting, and in this state the transmission cannot be stopped unless the measurement is stopped.

■ Simulation by a Trigger

In the simulation preparation, set the trigger setting to “Send data” for triggers 0 to 7 in the “Trigger” setting. When measurement is started and the trigger conditions are met, the data transmission control can be performed automatically. As no operation is required from the operation panel, it can also be used in communication logger mode.

5.8 LIN Simulation

■ Starting the LIN Master Simulation

1. Click “Run measurement” to open the operation panel.



* Request ID table buttons 0 to F and setting details (ID) are displayed.

* The operation panel does not open while measurement is stopped or in online mode.

* [WekeUp(80h)] can transmit the dominant of 80h while [WekeUp] can transmit the dominant of 0.25msec or more.

Dominant time will be the time of the sum of 1 bit time of the configured communication speed when it is more than 0.25msec.

* “Stop repeated sending” is not available.

* When setting “ON” for “Schedule”, the headers are automatically sent in the order of Request ID tables after starting the measurement.

2. Click the button for the table number (Request ID table number (No.)) you wish to send.

When the monitored header in the LIN communication is matched with the ID set in the table 0 to F, the response data is automatically sent.

■ Starting the LIN Slave Simulation

1. Start measuring.
2. When monitored transmission request header from the Master is matched with the ID set in the table 0 to F, the response data is automatically sent.

* The transmission request header from the Master is necessary to send the data.

* Sending only [WekeUp(80h)] or [WekeUp] is possible for Protocol Analyzer mod.

Sending data by pressing the table number and “Stop Repeat transmission” are not available.

■ Stop the simulation

1. Close the control panel.
2. Execute “stop measurement”.

< Caution >

In data logger mode, operations using the operation panel are not possible.
You cannot stop the transmission without stop the measurement.

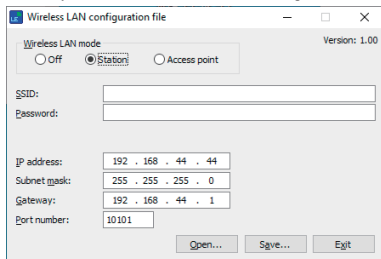
To use Wi-Fi function of LE-270AF/ LE-270GF, you need to power the analyzer after inserting SD card in which Wi-Fi configuration file (WLANCFG.WL) is written.

< How to make a Wi-Fi setting file >

1. Click LE Wireless LAN configuration from the start menu.
2. Select Station or Access point and set the items to be required.

■ Station Mode

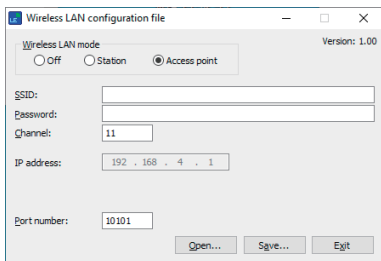
The analyzer connects with Wi-Fi via access point.



- SSID : Set the SSID of the access point to be connected.
- Password : Set the password of the access point.
- IP address : Set the IP address of the analyzer.
- Subnet mask : Set the subnet mask of the analyzer.
- Gateway : Set the IP address of the gateway when you use it.
- Port number : Set the data port of the analyzer.

■ Access Point Mode

The analyzer turns to be an access point and connects with Wi-Fi.



- SSID : Set the SSID of the analyzer.
- Password : Set the password of the analyzer.
- IP address : The IP address is fixed to 192.168.4.1
- Channel : Set the channel to be used for Wi-Fi connection.
- Port number : Set the data port to be connected.


* DHCP server function is set to valid in the access point mode.

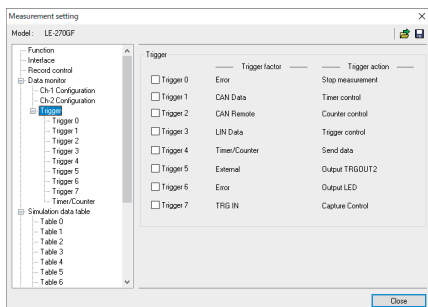
You can use "Automatically obtain IP address" in the network setting of PC.

3. Press "Save" to save the setting file for Wi-Fi (WLANCFG.WL) to a SD card.
4. Insert the SD card in which Wi-Fi setting file is written into the analyzer.
5. Power the analyzer.

7.1 Trigger Function

Trigger function is to start a specific action upon occurrence of a specific event as the trigger. A perplexing flow of data, which is not easy to be analyzed in the normal monitor operation, is analyzed on the basis of occurrence of the specific event.

Click “” on the tool bar of the data window (or “Measurement” -> “Measurement setting”). And then open the trigger setting.



Up to eight triggers can be set.

Trigger factor and action can be set for each trigger independently.


Each trigger can be set either to be enable or disable.

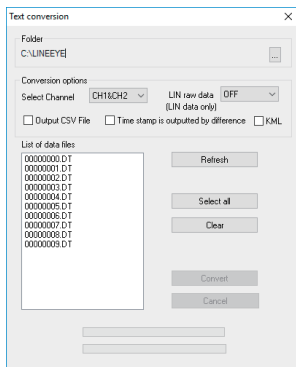
Trigger condition	Description
Error	CAN/CAN FD/LIN error detection
CAN Data	Detection of specific CAN/CAN FD data frames
CAN Remote	Detection of specific CAN remote frames
LIN Data	Detection of specific LIN frames
Timer, Counter	Timer or counter corresponds with the set value
External Input	The logic of external inputs (EXIN1 to 4) matches the set value
TRG IN	TRG IN edge matches the set value

Trigger action	Description
Stop measurement	Stop measurement
Timer control	Start, stop, and restart of timer
Counter control	Clear and count up of counter
Trigger control	Performs actions to enable or disable triggers
Send data	Transmission control of CAN data table
Output TRGOUT2	It outputs about 1ms Low pulse to TRG OUT2.
LED output	ON/OFF of the specified LED.
Capture Control	Start/Stop capturing. ^{*1}

7.2 Text Conversion

Measured data can be converted into text file or CSV file.


Click “” on the tool bar of the data window (or “Tool” -> “Text Conversion”).



- [Folder]
Select the file to convert into text.
- [Conversion Options]
Select the type of conversion.

- [Conversion Channel]
Select from “CH1&CH2”, “CH1” or “CH2”.
- [LIN RAW data]
Select only for LIN communication.
OFF : Do not include the parity bit on the ID. Framing error will be converted as “##”. Others will be displayed in HEX.
ON : Include the parity bit on the ID. Framing error and all data will be displayed in HEX.
- [Output CSV file]:
Output data in CSV format.
- [Timestamp is output by difference]:
Output elapsed time stamp from the previous frame.
(If selecting CSV format, elapsed time stamp is always output.)
- [KML]:
It outputs the GPS data (latitude, longitude) of LE-270GF as KML format file.
- [Data file list]
Select the files to convert into text format. Click once to select, and click again to release the selection.
It is able to select more than one files.
- [Refresh]
Update the list of data files.
- [Select All]
Select all files in the data file list.
- [Clear]
Clear all files selected in the list of data files.


■ Execute Conversion

Select the monitor data files and click “”.


Converted file will be saved in the selected folder.

According to the configuration settings in the SD card, analyzer can record data for long hours without a PC.

8.1 Preparation of Data Logger Mode

Click “” on the tool bar of the data window (or click “Measurement” -> “Measurement setting”) to open the setting display and set the items for data logger mode.

1). Select the interface.

 3.2 Configuration of Analysis Software

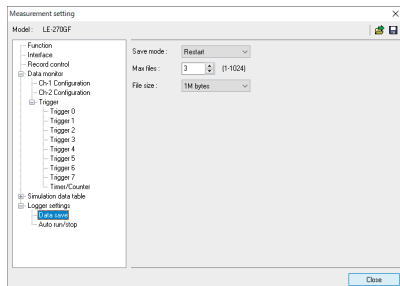
2). Select the configurations according to the target devices.

 4.1 Communication Condition

3). Select the trigger conditions if necessary.

 7.1 Trigger Function

4). Select how to save the data.



● Saving Mode

“Restart” : Delete the existing files first, and then start measuring from the file name of “#0000000.DT”.
Record data as a ring mode. (Delete the oldest file when the number of files reaches to the “Max Files”.)

“Max-stop” : Delete the existing files first, and then start measuring. Stop measuring when the number of files reaches to the “Max Files”.

“Append” : Existing files will not be deleted. Record data as a ring mode. The file name will be the sequence number after the existing files.

Select “Append” for normal operation. Especially when you use Auto RUN/STOP function, or in the condition of [Run] key can be pressed accidentally, select “Append” mode.

● Max Files

Set the max number of files to save.

* For 2GB SD card, the max file number for saving data will be 512.

- File Size

Select the file size to save.

“Max Files” x “File Size” will be the capacity of logging data. Consider the actual memory capacity of the SD card.

(An example of SD card capacity) 2GB SD card: 1.8GB

8GB SD card: 7.4GB

• Following is the table of consuming memory by one frame.

	Per 1 frame (Up to 8 bytes of data)		Per 1 frame (Up to 36 bytes of data)		Per 1 frame (Up to 64 bytes of data)	
	Without GPS/ acceleration monitoring	With GPS/ acceleration monitoring	Without GPS/ acceleration monitoring	With GPS/ acceleration monitoring	Without GPS/ acceleration monitoring	With GPS/ acceleration monitoring
LE-270AF	About 32 Bytes	-	About 64 Bytes	-	About 96 Bytes	-
LE-270GF	About 32 Bytes	About 64 Bytes	About 64 Bytes	About 96 Bytes	About 96 Bytes	About 128 Bytes


Numbers of frames saved in the 1M data of one file is following.

	Numbers of frames saved in the 1M data of one file					
	Per 1 frame (Up to 8 bytes of data) (CAN/CAN FD/LIN)		Per 1 frame (Up to 36 bytes of data) (CAN FD)		Per 1 frame (Up to 64 bytes of data) (CAN FD)	
	Without GPS/ acceleration monitoring	With GPS/ acceleration monitoring	Without GPS/ acceleration monitoring	With GPS/ acceleration monitoring	Without GPS/ acceleration monitoring	With GPS/ acceleration monitoring
LE-270AF	About 32.768 frame	-	About 16.384 frame	-	About 10.922 frame	-
LE-270GF	About 32.768 frame	About 16.384 frame	About 16.384 frame	About 10.922 frame	About 10.922 frame	About 8.192 frame

Reference for how long it can record (When max. file number: 450, filesize: 4MByte (1.8GB in total))

In the case that it transmit a frame in the interval of 1m second

Frame number per 1 file (4M)	Record time per 1 file (4M)	Record time for 450 files
About 131072 frames	About 2 minutes and 10 second	About 16 hours

Click “” to save the configuration in the SD card. The file name will be “LE270F#.SU”. Before starting the measurement as a data logger mode, read the configuration file (“LE270F#.SU”) to the analyzer.

<Attention>

The analyzer does not log the data if you use a SD card which has more capacity than the one supported by the analyzer.

8.2 Start and End of the Measurement

■ Start Measuring

- 1). Connect the analyzer to the target device.
- 2). Insert the SD card, which saves the configuration (LE270F#.SU) of the analyzer.

* The analyzer will not record data if there is not the SD card with configuration data.

- 3). Supply the power to the analyzer using the AC adapter or power cable (SIH-2PG). LED of POWER/ ERROR will be lighting in orange.
- 4). If Auto Run function is set, LED of RUN/ACT will be lighting in green. If setting the date of Auto Run, the power will be supplied at 1 minute before starting the measurement, and LED of RUN/ACT will be lighting.

* The configuration will be sent to the analyzer when switching on the power of analyzer. Even you change the SD card after switching on the power, the measurement will start according to the configuration of SD card which was set when switching on the power of analyzer.

If you do not use the Auto Run function, you need to press the RUN/STOP button.

* Make sure to check the light of LED of RUN/ACT after clicking the RUN/STOP button.


■ End Measuring

Click the RUN/STOP button if LED of RUN/ACT is lighting in green.

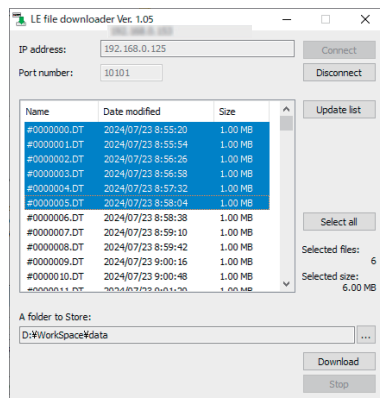
* Do not remove the SD card or power supply while LED of RUN/ACT is lighting in red.

8.3 Receive the logger files by Wi-Fi connection.

When using the logger mode, the application “lefiledownl.exe” can transfer the log files in the SD card to the PC via Wi-Fi. To use this application, copy the Wi-Fi setting file “WLAN CFG.WL” made by “Wireless LAN configuration file” to the SD card (which is used for the logger mode) besides the setting file for the logger mode.

 Chapter 6 Use of wireless LAN (Wi-Fi)

*Start “LE file downloader” by clicking this application from the start menu.



1) Input the IP address and the port number set in the analyzer.

2) Click “Connect” and the list of log files appears.

Click “Update list” and the latest ones are displayed on the list window.


3) Select the target data. To select all data, click “Select all”.

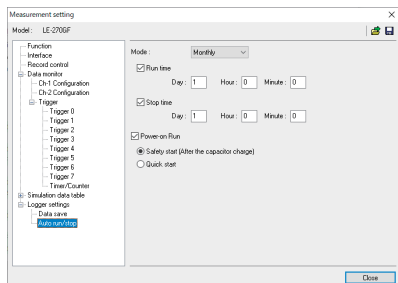
(Note): Files in the middle of logging cannot be transferred correctly (an error will occur when displayed).

Please note that the file with the largest file name number may be in the middle of logging.

4) Click “Download” to send the files to the selected folder.

8.4 Auto Run/Stop Function

By setting the specified start and stop time/date, the analyzer can automatically start and stop the measurement. Click “” on the tool bar of the data window (or click “Measurement” -> “Measurement setting”) to open the setting display and set the items at “Auto run/stop”.



* Mode

[Monthly] :

Start measuring at the specified time every month.

[Daily] :

Start measuring at the specified time every day.

[Hourly] :

Start measuring at the specified time every hour.

* Run time

Specify the starting time of the measurement. The power will be supplied at 1 minute before starting the measurement.

* Stop time

Specify the ending time of the measurement. The power will be turned off after the measurement automatically.

* Power On Run

Start measuring when powering on the analyzer. Select from “Safely start” or “Quick start”. For normal operation, select “Safely start”. Safely start will start measuring approximately 40 seconds after powering on the analyzer for charging the capacitor for back-up data.


Time stamp information is based on the time of RTC (Real Time Clock) embedded in the analyzer. RTC is set when the product is released from the factory. And also when connecting it to the PC by protocol analyzer mode, RTC is set according to the time of the PC.

8.5 Use of Log files

Log files will be named as “xxxxxxx.DT”(“x” will be the sequential number).

These files can be analyzed by “LE-LINK27F”.

1). Insert the SD card to the SD card drive of the PC.

2). Click “” button, (or “File” -> “Open files”) and select the SD card drive. If you open more than one files, it will be displayed as sequential data.

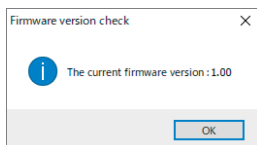
* Do not remove the SD card while opening more than one files,

You can update to the latest firmware by the PC, which installed the USB driver. The latest firmware will be available from the LINEEYE website. Connect the analyzer to the PC and execute "LE8FIRM.EXE" and follow the instruction.

■ Check Firmware Version

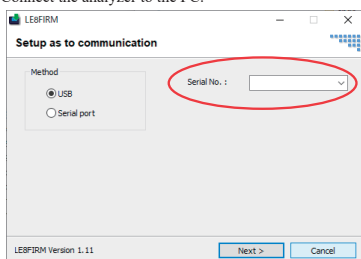
Click "Tool" -> "Check firmware" of the "LE-LINK27F".

If you need to update it to the latest firmware, execute "LE8FIRM.EXE" which is stored in the attached CD-ROM.

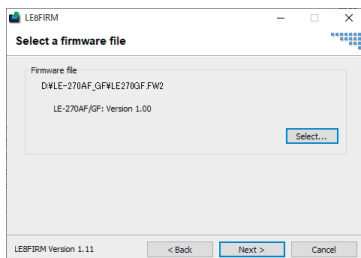


■ Update Firmware

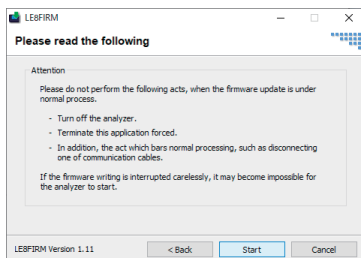
Connect the analyzer to the PC.



- 1). Double-click on "LE8FIRM.EXE".
- 2). Select the serial number of the analyzer
- 3). Click [Next].



- 4). Select the downloaded firmware file



- 5). A note for updating firmware will be displayed. Read it carefully and click [Start].

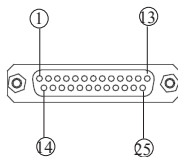
The firmware loader will start operating. The LED of POWER/ERROR will be lighted Off and LED of RUN/ACT will be lighted On while the firmware loader is operating.

- 6). After a short time the firmware is updated and a message "Complete" appears.

10.1 Interface (CAN/LIN/External Input)

Dsub 25pin connector is for the port of CAN, LIN and external input signal.

Pin NO	Signal name	Function
1	BATT	LIN battery power input and analyzer power input
4	GND	Signal Ground
7	GND	Signal Ground
9	EXIN1	External Input 1
10	EXIN2	External Input 2
11	EXIN3	External Input 3
12	EXIN4	External Input 4
14	TRG_IN	Trigger Input
15	CAN_1H	CAN Signal (channel 1)
16	CAN_1L	
17	TRG_OT2	Trigger Output 2
18	TRG_OT1	Trigger Output 1
19	CAN2_H	CAN Signal (channel 2)
21	CAN2_L	
22	GND	Signal Ground
23	LIN1	LIN Signal (channel 1)
24	LIN2	LIN Signal (channel 2)



* No. 4, 7 and 22 are connected internally.

Connect the ground of same electric potential to those pins.

10.2 External Input/Output Terminal

<External trigger input/output terminal>

Pin NO	Signal name	Function/Specification
14	TRG_IN	External trigger input Range: -0.5V - 6.0V TTL level input +5V, 10kΩ pull-up
17	TRG_OT2	External trigger output 2 Open drain output +5V, 10kΩ pull-up
18	TRG_OT1	External trigger output 1 Open drain output +5V, 10kΩ pull-up

<External input signal>

Pin NO	Signal name	Function/Specification
9	EXIN1	Input 1, 160k pull-down, Range: $\pm 25V$
10	EXIN2	Input 2, 160k pull-down, Range: $\pm 25V$
11	EXIN3	Input 3, 160k pull-down, Range: $\pm 25V$
12	EXIN4	Input 4, 160k pull-down, Range: $\pm 25V$

* EXIN1-EXIN4 are non-isolated (use same ground).

* Range of analog measurement is $\pm 16V$. Max. Input is $\pm 32V$.

10.3 Specifications

Model		LE-270AF	LE-270GF
Interface		CAN/CAN FD: Comfort to ISO11898-2:2016 standard. MCP2544FD LIN: Comfort to ISO9141 standard. TJA1021	
Isolation		—	1kV galvanic isolation between USB connector / SD card slot and measurement process section.
Connector		DSUB 25 pin male connector #4-40UNC	
Number of Channels		2 channels (2 ports of CAN/CAN FD or LIN, or a combination of 1 port each of CAN/CAN FD and LIN)	
Protocol		CAN, CAN FD (ISO/ non-ISO), Device net, LIN (Rev1.1, 1.2, 1.3, 2.0, 2.1)	
Baud Rate		CAN/CAN FD: 125Kbps to 1Mbps, CAN FD (data phase): 1Mbps to 5Mbps, LIN: 400bps to 26Kbp (arbitrary speed)	
CAN Monitor		Standard/ Expansion format. Sample points can be set arbitrarily	
LIN Monitor		Frames can be separated by specifying data length for each ID or by time (standard maximum frame time).	
Error Check		CAN/CAN FD CRC, ACK, Error frame, Form LIN Break, Sync, Parity, Checksum, Framing, Response	
Memory		PC: Max. 32G byte in the HDD. Logger mode : Capacity of SD card. (Able to specify 128K/1M/2M/4M/8M/16M/32M and numbers of files)	
Mode		Remote mode (with PC); Data Logger mode (PC-less)	
Measurement test mode		Online mode, Manual transmission mode	
Measurement start/stop		Control from PC, Start/Stop switch, Auto-Power run, Specify date and time.	
Time Stamp		9 digits: "Hr:Min:Sec:x1ms", "100µs", "10µs", "1µs" (selectable)	
Filter		Record specific ID (Bit-mask available) for each channel (acceptance filter). For CAN, there are also pass filter (8sets), cut filter (8sets) which can be used with acceptance filter.	
Display on PC		Real-time display, Watch data display (display specified data of each ID), Analog waveform display.	
Trigger	Condition	Error (Break, Sync, Parity, Framing, CRC/Checksum) ^{*)} , specific CAN data frame (channel, ID, data, off-set, bit-mask), specific CAN remote frame (channel, ID), specific LIN frame (channel, ID, data, bit-mask), timer/counter coincidence, external signal logic, external signal input edge.	
	Action	Stop measurement (offset can be set), validates/invalidates trigger condition, control timer/counter, turn on/off the light of user-defined LED, output external signals, transmit CAN data (if using Manual mode), start/stop capturing.	
Retrieval function on PC		Trigger matched data, Error (ACK, form, error frame, break, sync, parity, Checksum, Framing, CRC/ Checksum), specific CAN data frame (channel, ID, data, off-set, bitmask), specific CAN remote frame (channel, ID), specific LIN frame (channel, ID, data, bitmask), specific time stamp, external signal logic	
Conversion		Convert data into Text, CSV or KML format and save.	
External Signal Input		4 channels of Digital/Analog. Recording: At the time of receiving signals, or specified sampling cycle (1ms - 10min, 13steps). Analog input: -16V to +16V/0V to 32V, Resolution: 10bit, Accuracy: ±0.5%FS, Max. 50Ksps. Digital input: threshold: 1=2.2V or more	
Acceleration data		—	Register and display the acceleration data of X/Y/ Z axis. The sensor KX022-1020-FR or equivalent is built-in.
GPS positioning data		—	Register and display the latitude, longitude, above sea level. SMA (femal) connector for active GPS antenna is built-in.
LED		5 two-color LED: Power/Error, Measuring/Recording, CH1/CH2, User-defined U1/U2, WiFi/GPS ^{*)}	
Switch		One: RUN / STOP	
External Trigger Signal		1 Input, 2 Output (equipped in the measurement connector)	
SD Card		2 – 32Gbyte SD/SDHC ^{*)}	
USB2.0 Port		Mini-B connector. High speed supported.	
Wi-Fi Connection ^{*)}		IEEE 802.11 b/g/n Frequency range : 2400MHz-2483.5MHz TX POWER: 802.11b: +20dBm 802.11g: +17dBm 802.11n: +14dBm	
Power		USB bus power, DC-IN, or 1 pin of battery terminal of measurement connectorExternal DC power (DC9-34V), AC adapter (6A-181WP09).	
Power consumption		About 1.4W (2.8W when using Wi-Fi) ^{*)}	About 2W (3.4W when using Wi-Fi) ^{*)}
Run time during power failure		Approx. 0.5sec	
Ambient Temperature, Humidity		In operation: -20~+55°C In storage: -20~+60°C, 20 - 85%RH (No condensation)	
Dimension, mass		86(W)×130(D)×30(H) mm approx. 240g	
Environment of PC		OS: Windows® 10/11 PC: PC/AT compatible	
Accessories		PC software, Mini-USB cable, CAN/LIN Dsub cable, Power plug cable, 8G byte SDHC card, Instruction Manual, Warranty	

*1: LE-270AF does not have GPS function.

*2: "Break, Sync, Parity, Framing" are available only for LIN.

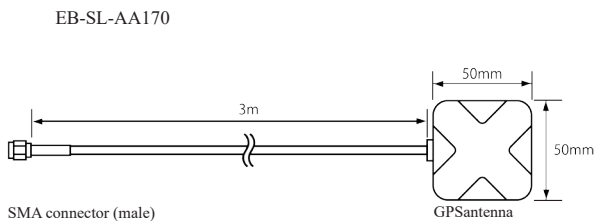
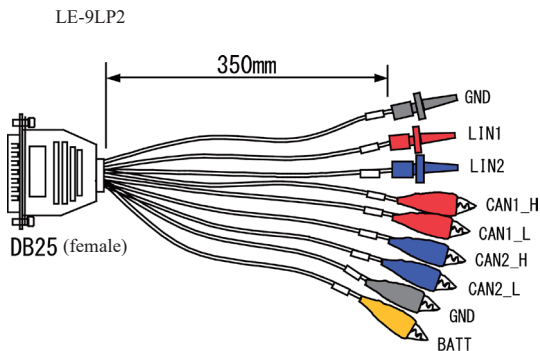
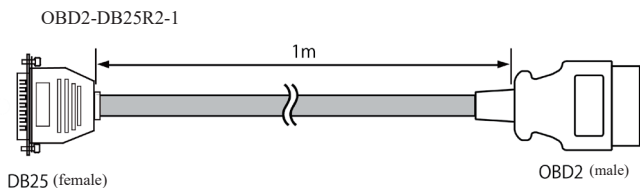
*3: Only SD/SDHC cards sold or attached by LINEEYE are supported.

*4: Wi-Fi function is available only in Japan, USA, Canada, and EU nations where the product is needed to be compliant with RE directive (2014/53/EU). The Wi-Fi function of this product is set to invalid depending on the country where it is shipped. Please contact LINEEYE for the detail.

*5: When supplying DC12V from DC-IN.

10.4 Options

- * Wide input AC adapter : 6A-181WP09 : Power supply for Data Logger mode, DC9V center (+)
- * OBD2-DSUB25 cable : OBD2-DB25R2-1 : CAN monitor cable for OBD2 connector (1m)
- * Clip cable : LE-9LP2 : CAN/LIN clip monitor cable.
- * GPS active antenna : EB-SL-AA170 : Supports Beidou, GPS, and GLONASS. Waterproof and dustproof (IP65) Available only with LE-270GF
- * DIN rail mounting plate : LE-DIN13 : To connect analyzer on the 35mm DIN rail.



Warranty

- * This product package contains a warranty.
- * Read the warranty and keep it in the safe place.

Repair

- * LINEEYE will repair the product according to the warranty.
- * After the warranty period, LINEEYE will repair the product for you to use the functions properly at your own expense. If your product needs to be repaired, please tell us the model name, serial number, purchased date, and the details of problems.

---User Registration---

Please register your products from our website. We will provide you the update information and so on.

There is a registration page on our web site.

(<https://www.lineeye.com>)

Please register your product for further support.

We will provide you the firmware update
information and sales information etc.

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